

Enzymes in Action

Name: _____

Period: _____

Background: Enzymes are catalysts that make chemical reactions happen more quickly by lowering the activation energy required to start the reaction. Enzymes have specific shapes that give them specific functions; every enzyme has one reaction that it catalyzes. In this lab, you will observe the enzyme lactase in action by observing the effects of lactase on various substrates.

Objectives: Observe the action of lactase on several substrates.

Question: Which substrates in the presence of lactase will test positive for glucose?

Pre-Lab:

1. What is activation energy?
2. What are substrates?
3. What monomers make up lactose?
4. What monomers make up sucrose?

Variables:

Manipulated:

Responding:

Controlled:

Hypothesis (Hint: Which substrates will lactase break down? Why?):

Data:

Test Strip number	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
Solution	<u>Glucose</u>	<u>Water</u>	<u>Milk</u>	<u>Milk with Lactase</u>	<u>Sucrose</u>	<u>Sucrose with Lactase</u>
Visual observations (color)						
Test result (+ or -)						

Analysis:

1. Was the lactase successful in breaking down the lactose in milk? How do you know?
2. Was the lactase successful in breaking down the sucrose? How do you know?
3. What does this tell you about the substrates that enzymes work with?
4. What is the cause of lactose-intolerance?
5. What are two ways a person who is lactose-intolerant avoid unpleasant symptoms?
6. How much apple juice was extracted from the applesauce without pectinase?
7. How much apple juice was extracted from the applesauce with pectinase?
8. Why did this happen? (Be as detailed as possible based on what you know about enzymes).

Conclusion:

1. Describe what must occur to glucose in order for an organism to use its atoms as part of other molecules. Think about what you have learned about chemical reactions and digestion.
2. State whether there is anything else besides the elements found in glucose, needed to form each of the 4 types of macromolecules:
 - a. Carbohydrates:
 - b. Proteins:
 - c. Lipids:
 - d. Nucleic acids: